

REMARKS

Entry of the amendments is respectfully requested. Claims 7 and 14-18 have been amended. Claims 1-20 remain pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the forgoing amendments and the remarks that follow.

Allowable Subject Matter

Applicant notes with appreciation the indication of allowable subject matter in dependent claims 2-4, 6, 8, 10 and 12-13. In view of the arguments below pertaining to the independent claims corresponding to these claims, namely claims 1 and 9, Applicant has chosen not to rewrite these claims for now.

§ 112 Rejections

In the Action, the Examiner rejected claims 7 and 14-18 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and claim the subject matter which the Applicant regards as the invention. In particular, in regard to claim 7 and 14, the Examiner noted that the limitation “wherein the boosted drive signal is 20 to 30 percent of the probe drive signal above than the probe drive signal” could be amended to state “wherein the boosted drive signal is 20 to 30 percent above the probe drive signal.” Applicant agrees with the Examiner and has amended the claims accordingly. Therefore, Applicant believes that in light of the amendments, claims 7 and 14 are definite in scope and respectfully requests that the Examiner withdrawn the rejection to claims 7 and 14. The amendments to claim 7 and 14 are in no way believed to narrow the scope of the claim and are for clarification purposes only.

The Examiner next contends that in claims 15 and 18, it is unclear how “the error signal” is interrelated and associated with “the phase signal” in claim 9.

Furthermore, in relation to claim 18, the Examiner noted that “it is unclear how the error signal is created.” In response, Applicant has amended claims 15 and 18 to clarify the relationship between “the phase signal” and “the error signal,” as the “error signal” is based on the “phase signal.” The amendments clarify the relationship that is described throughout the application and, as a result, Applicant believes that these rejections have been obviated.

More particularly, using a standard detection scheme 105 the paraboost module 110 detects oscillation amplitude, phase and other properties of the probe 120. The output of the detector scheme 105 is then transmitted to a phase detection circuit 212 (Figure 5), which provides a “phase signal” to the detector module 210. When the amplitude of the oscillation of the probe is too high or too low, an “error signal” based on the “phase signal” of the cantilever oscillation is generated and sent to the control module 150. Thus, the “error signal” is interrelated with the “phase signal” in that the “error signal” is generated based on the level of the “phase signal.”

Applicant believes that in light of the amendments, claims 15 and 18 are definite in scope and respectfully requests that the Examiner withdraw the rejection to claims 15 and 18. Although claims 15 and 18 have been amended, the amendments to claim 15 and 18 are no way believed to narrow the scope of the claim and are for clarification purposes only.

Next, the Examiner stated that it is unclear how “the oscillating amplitude is interrelated and associated with the phase signal in claims 15-16.” In response, the Applicant has amended claims 15-16 to clarify the relationship between “the oscillating amplitude” and “the phase signal.” As a result, Applicant believes that this rejection has been obviated. As noted above, using a standard detection scheme 105 the paraboost module 110 detects the oscillation amplitude of the probe. The output of the detector scheme 105 is then transmitted to a phase detection circuit 212 (Figure 5), which provides a “phase signal” to the detector module 210. Thus, as highlighted in the specification and claims, the oscillating amplitude is measured “so as

to generate a phase signal.” Applicant believes that in light of the amendments, claims 15-16 are definite in scope and respectfully requests that the Examiner withdrawn the rejection to claims 15-16.

Subsequently, the Examiner noted that “it is unclear what a ‘probe response signal’ is and where it is from” in claim 17. In response, the Applicant has amended claim 17 to remove this term and further clarify claim 17, such that Applicant believes that this rejection has been obviated. The amendment to claim 17 is in no way believed to narrow the scope of the claim and is for clarification purposes only. Applicant believes that in light of the amendment, claim 17 is definite in scope and respectfully requests that the Examiner withdrawn the rejection to claim 17.

Finally, the Examiner rejected claim 17 under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. The Examiner contends that the original disclosure does not disclose “a probe response signal.” Applicant respectfully disagrees with the Examiner’s conclusion. It is a well established tenet of patent law that the claims, as originally filed, form part of the initial disclosure. Applicant notes, that originally filed claim 17, claimed and therefore disclosed “a probe response signal.” However, despite the sufficient disclosure, Applicant has amended claim 17 to remove the reference to “a probe response signal” such that Applicant believes that this rejection has been obviated. As noted above, the amendment to claim 17 is in no way believed to narrow the scope of the claim and is for clarification purposes only. Therefore, Applicant believes that in light of the amendment, claim 17 is definite in scope and respectfully requests that the Examiner withdrawn the rejection to claim 17.

§ 102(e) Rejections

The Examiner rejected claims 1, 9, 11, and 19-20 under 35 U.S.C. § 102(e) as being anticipated by *Kitamura*, U.S. Patent No. 6,281,495. Applicant’s invention is drawn specifically to compensating for “parachuting” of a probe during operation of an AFM by boosting the drive. The present invention uses feedback to generate control signals indicative of a sample characteristic. The boost provided to alter the output of the drive in response to a detected

parachuting event is a separate operation. The detector circuit 105 detects changes in cantilever oscillation and corresponding signals are coupled to two independent circuits. First, the output is applied to a typical AFM feedback arrangement (represented by control module 150) to maintain a set-point oscillation, the control signals provided by the feedback arrangement being indicative of a sample characteristic. Second, the output is used as an input to a paraboost module 110 that (1) detects whether a parachuting event is occurring, and then (2) boosts the signal to minimize the adverse effects associated with a parachuting probe during a scan.

To the contrary, Applicant notes that *Kitamura* teaches an apparatus and method for producing a magnetic force image by taking the difference between the topographic data of a sample from the resonance frequency of a cantilever in non-contact mode by FM detection, and a second set of data derived from the amplitude of the cantilever by slope detection. *Kitamura* does not provide any teaching with respect to detecting and responding to “parachuting” of the probe during operation of an AFM by boosting the drive. As discussed at Col. 3, ll. 43-46, *Kitamura* only teaches a phase/amplitude adjuster 11 adjusting the phase of the reference wave from the waveform converter to maximize the positive feedback provided by an oscillation system. *Kitamura* does not teach or suggest detecting a reduction of a variation of the phase signal of the oscillating probe during what has been defined in this application as a “parachuting event” during an AFM scan. Applicant refers the Examiner to the specification of the application and its previous responses for more detail and discussion in this regard.

In view of the above, Applicant respectfully contends that claims 1, 9, and 19 as well as their respective dependent claims, are novel and non-obvious over the teachings provided by *Kitamura* and as such are allowable. An indication to this effect is respectfully requested.

CONCLUSION

It is submitted that claims 1-20 are in compliance with 35 U.S.C. §§112 and 102, as well as being non-obvious under §103, and as such each define patentable subject matter. A Notice of Allowance is therefore respectfully requested.

No fee is believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Commissioner is authorized to direct payment of such fees or credit any overpayment to Deposit Account No. 50-1170.

The Examiner is invited to contact the undersigned by telephone if it would help expedite the prosecution and allowance of this application.

Respectfully submitted,


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